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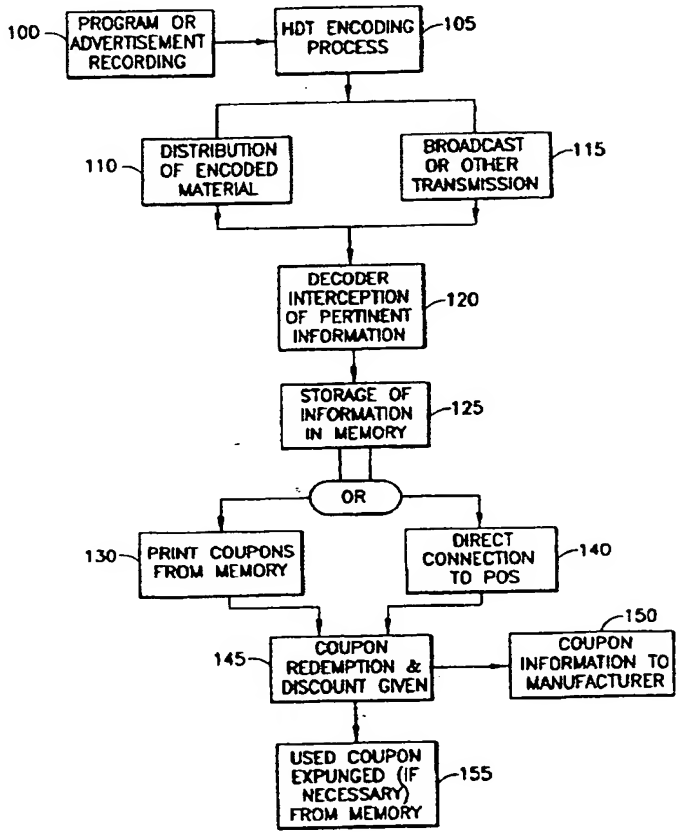
(54) Title: HIDDEN DATA TRANSPORT ELECTRONIC COUPON SYSTEM

(57) Abstract

Electronic coupon information is embedded in an audio, video or other primary signal (200) using a hidden data transport scheme. The electronic coupon information may be received and decoded by a low cost, portable decoder unit (400) in a consumer's home. The decoder may have a removable memory module (425) that can be easily carried by the consumer to a retail store. At the retail store, the consumer selects products to purchase and brings them to a point-of-sale (POS) terminal (600) at a checkout station. At the POS terminal, the memory module (425) or decoder (400) interfaces with the POS terminal (600) and a conventional scanner (605) to determine which products are eligible for the discount described in the electonic coupons. After crediting the consumer with the appropriate discount, a record of the transaction is stored in a database (615), and the retailer may transmit the database to the manufacturers via an interface (625) to obtain a reimbursement. The invention eliminates the need for retailers and manufacturers to process paper coupons, while providing consumers with various incentives.



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HIDDEN DATA TRANSPORT ELECTRONIC COUPON SYSTEM

This application claims the benefit of U.S. Provisional Application No. 60/008,369, filed December 8, 1995.

BACKGROUND OF THE INVENTION

The present invention relates to a method and apparatus for providing coupons and other promotional offers to consumers via an electronic transmission medium such as radio or television.

Currently, manufacturers often provide coupons which allow consumers to obtain a discount when purchasing the manufacturer's products or services. The coupon is typically printed in a newspaper, magazine, direct mail advertisement or other print media, and delivered to the consumer's home. The coupon is then carried to a retail store by the consumer where it is redeemed according to the terms printed on the coupon. For example, the coupon may offer a cash discount on a purchase, a buy one, get one free offer, or the like, and may further entitle the consumer to some other benefit such as entry into a contest or membership in a shopper's club.

However, it is expensive for manufacturers to run advertisements with printed coupons in various print media. For example, it may be necessary to provide coupons in several newspapers in a given geographic region. Many smaller businesses therefore are not able to run a cost-effective

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coupon distribution program. Moreover, it is time-consuming and expensive for retailers to verify that the terms of the coupon have been met and the coupon has not expired, to sort the coupons according to the issuing manufacturer, and to return the coupons to the appropriate manufacturer for reimbursement. Similarly, manufacturers are burdened with the task of handling the coupons and verifying that they have been properly redeemed. Furthermore, the process is environmentally wasteful because of the paper that is wasted when coupons are not used. In fact, studies show that only about two per cent of all coupons are actually redeemed.

Accordingly, it would be desirable to provide a coupon distribution system which allows manufacturers to electronically transmit coupons to consumers through various means including broadcast means such as cable, satellite, and terrestrial television broadcasts, radio broadcasts, cellular phone and pager transmissions, wired networks such as telephone networks, computer networks, the Internet, and intranets, and by pre-recorded media such as a compact disc (CD), digital video disc (DVD), or audio and audio/video cassettes. In particular, the system should provide the capability to carry the coupon data as an inaudible radio frequency signal in an audio data signal, and should

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be compatible with existing broadcast, recording and receiving equipment.

The electronic coupons should be comparable in function to coupons which are found in standard print media by providing a consumer with a discount on a specific product or service from the granting manufacturer or retailer. The system should provide or utilize an existing standardized format for usage across the aforementioned electronic media and communication networks, and should allow advertisements of varying length and content.

The system should also provide feedback to advertisers regarding the effectiveness of the coupons, for instance, by indicating the time the coupon data was transmitted and when it was redeemed, and information regarding the consumer. The system should provide an incentive for a consumer to listen to a conventional audio or audio/video commercial which accompanies the electronic coupon.

The system should provide an apparatus for a consumer to retrieve and store the coupon data for future use, including the capability to print the coupon, organize a number of coupons, delete coupons which have expired or are unwanted, prevent storage of duplicate coupons, and retrieve only specific types of coupons. The apparatus should be transportable and easy to use to allow the consumer

to redeem the coupon at a retail store. Alternatively, the apparatus should include a removable memory element such as a smart card which is easily transportable. Moreover, the apparatus should be cost-effective for the consumer to purchase and operate.

Furthermore, the system should provide automatic verification of each redemption and authentication of the electronic coupon information, be compatible with commonly used scanner equipment, provide a database of transactions, and provide the capability for automatic reimbursement by the manufacturer. The present invention provides a system having the above and other advantages.

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SUMMARY OF THE INVENTION

In accordance with the present invention, a method and apparatus are presented for providing electronic coupons via a pre-existing data stream. The electronic coupons may be received by a low cost, portable decoder unit which is located in a consumer's home or carried by the consumer. The decoder may optionally have a removable memory module. Either or both of the decoder and the memory module can be easily carried by the consumer to a retail store. At the retail store, the consumer selects products to purchase and brings them to a point-of-sale (POS) terminal at a checkout station. At the POS terminal, the memory module or decoder interfaces with the POS terminal and a conventional scanner to determine which products are eligible for the discount described in the electronic coupons. After crediting the consumer with the appropriate discount, a record of the transaction is stored in a database, and the retailer may transmit the database to the manufacturers to obtain reimbursement for the coupon amounts.

In particular, an apparatus for processing electronic coupon information which is carried in a data stream comprises an interface (such as a microphone or audio/video input jack or other

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appropriate sensor) for receiving the data stream, a decoder for recovering the electronic coupon information from the received data stream, and a memory for storing the recovered electronic coupon information. The electronic coupon information may be carried inaudibly in an audio data stream or imperceptibly in a video data stream according to a hidden data transport scheme.

The apparatus may also include a display for providing information regarding the electronic coupon information stored in the memory, and a user-activated control for selectively recovering and storing the electronic coupon information.

Moreover, the electronic coupon information may include various data segments, including a product code segment for identifying the product for which the coupon applies, a discount segment for identifying the discount offered by the coupon, and an expiration date segment for identifying when the coupon expires. The decoder may include a processor for automatically deleting coupons that have expired, or for replacing a coupon with another coupon for the same product which has a later expiration date.

An apparatus including a point-of-sale (POS) terminal for processing electronic coupon information is also presented. The POS terminal includes an interface for receiving the electronic

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coupon information from the decoder's memory, and a processor for determining whether the electronic coupon information is applicable to a particular product. The POS terminal may also retrieve additional information including a user profile, demographic data, audience survey information, or other consumer-related information.

Additionally, a database may be provided for storing the electronic coupon information and information associated with the particular product when the processor determines that there is a match between the coupon and the product being purchased.

The POS processor may delete the electronic coupon from the decoder's memory when the coupon is redeemed. Furthermore, the processor may receive a signal from a scanner which includes the universal purchase code (UPC) (e.g. bar code) of the product. This bar code can be compared to the electronic coupon data to verify that the product designated by the coupon is being purchased.

Corresponding methods are also presented.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 illustrates a method for providing electronic coupons in accordance with the present invention.

FIGURE 2 illustrates a data signal which carries electronic coupons in accordance with the present invention.

FIGURE 3 illustrates another embodiment of a data signal which carries electronic coupons in accordance with the present invention.

FIGURE 4 is a block diagram of a decoder for retrieving and storing electronic coupons in accordance with the present invention.

FIGURE 5 illustrates a method for storing electronic coupon data in accordance with the present invention.

FIGURE 6 is a block diagram of a point-of-sale apparatus for redeeming electronic coupons in accordance with the present invention.

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DETAILED DESCRIPTION OF THE INVENTION

A method and apparatus are presented for providing electronic coupon data to consumers via a communication network or pre-recorded media. The invention is particularly suitable for providing the electronic coupon data imperceptibly in an audio or video data signal.

The present invention is compatible with the Hidden Data Transport (HDT) schemes described in U.S. Patent Application No. 08/524,132 to C. Lee, et al., entitled "Method and Apparatus for Transmitting Auxiliary Data in Audio Signals", filed September 6, 1995, and PCT Patent Application No. _____ to C. Lee, et al., entitled "Method and Apparatus for Embedding Auxiliary Data in a Primary Data Signal", filed concurrently herewith, both of which are incorporated herein by reference. The invention is also compatible with other similar technology such as the audio tagging scheme disclosed in U.S. Patent 5,319,735 to R. Preuss et al., incorporated herein by reference. Furthermore, the invention may employ both digital and analog signals, and may use a scheme such as the Post-Compression Hidden Data Transport (PC-HDT) scheme described in U.S. Patent Application No. 08/607,330 to C. Lee, et al., entitled "Post-Compression Hidden Data Transport", filed February 26, 1996, incorporated herein by

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reference, to provide copy management for compressed digital audio streams such as those which follow the MPEG, Musicam, and Dolby AC-2 and AC-3 formats.

The aforementioned HDT and PC-HDT systems provide the capability to embed digital data into the waveform of a primary audio, video or other signal at a level that is below an interference noise threshold. For example, this threshold may be at a level such that the embedded data is not substantially perceptible to a human who is listening to an audio signal in which the data is carried or viewing a video signal in which the data is carried. Essentially, this means that the quality of the reproduced sound or image is not noticeably degraded. If the embedded data is carried in a primary signal that is itself not perceptible to a human, the data is carried in a manner such that it does not substantially interfere with the primary signal. In particular, the embedded data is provided with a suitable power spectrum which may be shaped according to the power spectrum of the primary signal.

The embedded digital data can be an undetectable identification code that provides copyright protection information or other data, such as a manufacturer's serial number. For many applications, the consumer or listener has no direct use for the embedded information. However, the

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electronic coupon (EC) system of the present invention uses the HDT scheme to embed information into an audio program which is immediately useful to the consumer. In particular, the EC system can provide the equivalent information found in a conventional printed coupon along with additional features not available with conventional coupons.

FIGURE 1 illustrates a method for providing electronic coupons in accordance with the present invention. At block 100, recording of a program or advertisement is initiated. At block 105, using the aforementioned HDT or PC-HDT systems or other compatible coding process, EC information is embedded into the audio stream of an advertisement or other program. For example, the EC information may be encoded into the audio stream during a final production stage of a radio or television advertisement, or at the time of broadcast. Alternatively, EC information may be embedded into the audio stream of a musical performance which is recorded on a compact disc or the like. Moreover, the EC information may be compressed according to various existing audio data compression schemes such as MPEG, Musicam, and Dolby AC-2 and AC-3.

The information contained in the EC may include a universal product code (UPC) for the product being promoted, the type and amount of discount, the expiration date of the promotion, program

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identification which identifies the broadcast program such as a television or radio program in which the EC is carried, the time and date the EC was transmitted, and information which identifies the network or station which is broadcasting the EC data. The term "product" as used herein denotes any product, goods, services, or the like which may be purchased, rented or otherwise acquired in a permanent or temporary manner.

At block 110, if the EC information was embedded into material such as a CD or DVD, the material is distributed through conventional methods, for example, by shipping the goods to a retail outlet, where the goods are subsequently purchased by the consumer. The term "retail" as used herein is meant to encompass retail sales per se as well as other types of transactions, including those at the wholesale and re-sale levels, and the like. Alternatively, at block 115, the EC information may be transmitted with a television or radio broadcast or via another communication network. Advantageously, after a commercial with the embedded EC information is made available at a broadcast site, which may be a network radio station, for instance, the advertisement may be queued for play at a set time in a conventional manner. That is, since the EC information is embedded in an audio signal in a seamless manner,

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there are no special procedures or equipment required by the broadcaster when handling an EC advertisement.

However, the broadcaster may wish to obtain an encoder such as an HDT or PC-HDT encoder in order to add additional information such as a station identifier, date and/or time stamp to the advertisement. Such information can be useful for marketing purposes since it will allow a broadcaster to verify that an EC which was carried in its programming was retrieved and redeemed by a particular number of consumers, thus allowing the broadcaster to set advertising rates accordingly.

Additionally, the EC information may be embedded in the audio signal in a real-time manner, for example, as the advertisement is being broadcast. That is, instead of requiring the EC information to be in place during the production of the advertisement, the EC information can be embedded at the time of the transmission. Moreover, the real-time EC information does not necessarily have to correlate to the particular advertisement or program being transmitted. Further, this capability may be used by a particular broadcaster for promotions. Or, the broadcaster may wish to provide its own EC information for promotional purposes. For example, the EC information may allow

a consumer to enter a sweepstakes contest offered by a radio station by shopping at a particular store.

At block 120, the EC information of the advertisement is intercepted (e.g., retrieved) by a decoder of the present invention, described in greater detail in connection with FIGURE 4. The retrieval and decoding of the EC information may occur with a decoder located in a consumer's home, for instance. After the advertisement containing the EC information has been transmitted over an available broadcast channel or played from a recorded media such as a CD, the decoder can intercept the audio portion of the advertisement and decode the relevant information. In particular, the decoder can include a microphone for sensing the audio signal after it is reproduced by a speaker, or an audio input jack may receive the audio signal directly from a conventional television or radio receiver.

At block 125, the EC information which was retrieved and decoded is stored in a memory of the decoder. Thus, the consumer may maintain a collection of ECs which may be organized and reviewed as desired. Furthermore, using an interface such as a keypad, a consumer may organize the ECs according to the type of goods or services, the manufacturer, the expiration date, or the value

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of the discount. A display screen may also be provided for this purpose.

At block 130, the consumer may optionally print the EC on a printer to obtain a paper coupon which may be redeemed. Or, at block 140, the consumer may bring the decoder or a memory storage element of the decoder such as a smart card to a point-of-sale (POS) terminal at a retail store, as will be discussed in greater detail in connection with FIGURE 6.

At block 145, the consumer redeems either the printed paper coupon or the EC according to the terms of the EC. In particular, the EC information may interface with a retailer's scanner and cash register equipment to verify that the EC is applicable to the purchased goods. For example, the EC information may include the UPC of the goods which are promoted. In this case, the UPC from the goods detected by the retailer's scanning equipment may be compared to the UPC from the EC. If there is a match, then the discount is tendered. If not, a message may be provided so that the consumer may be informed of the correct item to purchase. For example, the consumer may have inadvertently selected a medium sized box of cereal when the EC applied only to a large box.

At block 150, the EC information is provided to the manufacturer so that the retailer may be

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reimbursed for the discount tendered. Advantageously, when the EC of the present invention is used, the EC information may be electronically transmitted to the manufacturer immediately after the EC is redeemed, or at a selected time thereafter, e.g., daily. This can relieve the retailer of the time consuming and expensive task of managing a large number of paper coupons.

At block 155, the EC information of the coupon that was used may be expunged (e.g., erased) from the decoder's memory. In this way, the consumer may not redeem the EC again. Alternatively, the EC information may allow the consumer to redeem the EC a given number of times. Furthermore, the EC information may indicate that the EC may be redeemed again after a certain time interval, such as once a week.

FIGURE 2 illustrates a data signal which carries electronic coupons in accordance with the present invention. The data signal, shown generally at 200, includes an audio program portion 210 and an EC information portion 220. The audio program portion 210 may include an advertisement which is, or, is not associated with the EC information. Preferably, the audio program is associated with the EC information so the consumer will listen to the advertisement while receiving the EC information.

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In the data signal portion 220, the EC information is provided as a repetitive bit stream throughout the advertisement or program. The data signal portion 220 includes a plurality of data segments 222, 232 and 242 which, in this example, include the UPC, while data segments 224, 234 and 244 include expiration date information, and data segments 226, 236 and 246 include information of the discount or promotion being offered. Thus, the three data segments are continuously repeated throughout the data segment portion 220. This configuration allows the consumer to receive the EC information without listening to the entire audio program 210. Alternatively, the EC information may be repeated in a periodic manner (e.g., every three seconds).

FIGURE 3 illustrates another embodiment of a data signal which carries electronic coupons in accordance with the present invention. The data signal, shown generally at 300, includes an audio program portion 210 and an EC information portion 320. In the data signal portion 320, the EC information is provided as a non-repetitive bit stream throughout the advertisement or program. The data signal portion 320 includes UPC data segment 222, expiration date data segments 224, and discount information segment 226. Note that data segment 222 is separated from data segment 224 by a segment 323,

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which may be blank or may contain other information. Furthermore, data segment 224 is separated from data segment 226 by segment 325.

This configuration requires the consumer to tune to the advertisement for a time period which is sufficient to retrieve all of the EC information data segments, thereby encouraging the consumer to participate in the viewing or listening of the entire advertisement instead of changing the channel in the middle of the advertisement. With either of the configurations of FIGURES 2 or 3, each segment of the EC information (e.g., segments 222, 224 and 226) must be retrieved in order for the decoder to properly recover and decode the EC information.

It should be understood that the data segment configurations set forth in FIGURES 2 and 3 are examples only, and that various data formats are possible. Furthermore, the data stream may require specific packet formats in order to conform with a specified communication protocol, and may require different fields, headers, layers, packet configurations, synchronization information, error-control and data compression information and the like to meet the needs of a specific application.

FIGURE 4 is a block diagram of a decoder for retrieving and storing electronic coupons in accordance with the present invention. The decoder, shown generally at 400, includes an interface 410,

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HDT decoder 420, memory module 425, processor 435, display 440 and power supply 430. Alternatively, the decoder 420 may be a PC-HDT decoder or operate according to some other compatible encoding scheme. The display 440 may be a small screen such as liquid crystal display (LCD) screen which allows the user to review each item which is stored in memory. The display may also generate a bar code for a coupon to be redeemed. In this case, the display itself is scanned by a conventional POS terminal scanner.

Furthermore, the decoder may provide the capability for the consumer to sort and display the EC information according to, for instance, product or service type, expiration date, manufacturer, geographic location, and so forth. The power supply 430 may be a battery. The decoder 400 is connected to a printer 450 in the configuration shown to allow printing of paper coupons using the EC information, or to print a summary list of the ECs. With the printed coupon, the UPC bar code can optionally be printed, along with information such as the product name and logo or other design, product description, and the discount or promotional offer. A printed coupon with a bar code may be scanned into a POS system at a retail store.

The invention includes a number of decoder options. The decoder 400 may be a personal decoder, which is a small, light weight, low-cost unit which

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can be used by any person listening to EC encoded material. The decoder 400 captures and stores the EC information from any number of media channels, and can be carried into a participating and properly equipped retail establishment for redemption via a variety of means, including the POS apparatus discussed in connection with FIGURE 6.

Alternatively, the decoder need not be portable, but may be a desk top unit, in which case the memory module 425 may be provided as a portable memory such as a smartcard or random access memory (RAM) personal computer (PC) card. In this case, the consumer can remove the memory module 425 from the decoder and bring it to the retail store to redeem the ECs stored in the module.

Moreover, the memory 425 is preferably non-volatile so that a battery or other power failure does not cause the decoder 400 to lose the EC information which has previously been recovered and stored.

The primary functions of the decoder 400 are to capture the EC data stream, to decode that information, to store the appropriate information, and to allow the consumer to download the information to the POS system at a retail store. Furthermore, the decoder 400 or memory module 425 may interface with current POS equipment to access an in-store computer database which records all EC

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transactions. The interface 410 may comprise, for example, a microphone or audio input jack. A microphone is placed within range of a speaker which is playing the EC encoded signal, e.g., a radio advertisement, while an audio input jack may receive the EC encoded signal directly from a radio receiver. In either case, the interface 410 receives the audio segment of the advertisement and provides the audio data to the HDT decoder 420, where the audio data is decoded to recover the EC information. The recovered EC information is then provided to the memory module 425 and processor 435.

The processor 435 may comprise a central processing unit (CPU) which sends control signals to the HDT decoder 420, memory module 425, display 440 and printer 450. For example, the processor 435 may send write signals to the memory 425 to coordinate the writing of EC information recovered at the HDT decoder 420, and may send read signals to the memory 425 to obtain data for use by the display 440 or the printer 450. The printer 450 may receive signals from the decoder 400 via a wired or wireless path (e.g., infrared or wireless RF). The time and date may also be recorded when an EC is stored in memory.

The decoder may also include a button, switch, or other control (not shown) for allowing the consumer to manually accept a coupon instead of automatically capturing all coupon data. A

corresponding visual or aural alert may notify the consumer that a coupon is present in an audio program and prompt him to push the button to accept the EC information. In this way, the decoder 400 will not process EC information in which the consumer may not be interested.

Moreover, such an interactive feature can allow the consumer to choose to recover EC information from a particular piece of music, a program, or other material such that a "memo" (e.g., recording) is taken as the material is being played. The memo is then taken to a retail establishment for recall (e.g., display or print) so that the noted segment can be identified to assist the consumer in making a purchase. For example, the memo may include a number (e.g., International Standard Recording Code, ISRC) which identifies the material (e.g., a piece of music) from which the memo was taken. The consumer may then bring the decoder to an information center at a retail store where the number is identified and additional information is provided to the consumer on the particular material (e.g., song) from a stored or on-line database of information.

Alternatively, the decoder may include a hand-held scanner such as a wand for use in scanning the UPC of a product on the shelves of the retail store. The decoder then performs a comparison of the UPCs

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from the EC information to determine if there is a match. A visual or aural alert may be provided to inform the consumer accordingly.

Optionally, the decoder may recover only particular types of EC information. For example, a manufacturer may distribute decoders free of charge to consumers, but the decoders may only retrieve ECs for products made by that manufacturer, and not ECs for products of other manufacturers. Alternatively, the decoder may be set by the consumer to recover particular types of products and services. Or, the decoder may be set by the consumer or decoder distributor according to particular interests or demographic characteristics of the consumer. For example, families with school-aged children may belong to a particular group, while senior citizens may belong to another group.

Alternatively, programs and other non-coupon information may be passively captured by the decoder 400, or downloaded at the time of coupon redemption (e.g., from the POS or EC information center), or transmitted over a communication path such as a telephone line using a modem, a return link on an interactive television, cable, or satellite broadcast system, or a cellular or other wireless network.

Furthermore, it is possible to provide individually addressable decoders such that

information which is targeted to a particular decoder or group of decoders can be received only by those units. For instance, a group of decoders that have been identified as belonging to high quantity coupon redeemers or redeemers of specific types of coupons may be provided with EC information which provides a special incentive such as a "double coupon" or the like. The EC information in the data stream must be modified to include this additional identifying information.

Moreover, the decoder 400 may be integrated into a receiver system including, for example, a television, a cable system set-top box, a personal computer, and a radio, and may provide a direct feedback signal over an interactive return link. Furthermore, it is possible to use individually addressable decoders which may be selectively enabled or disabled by the EC information. Thus, the EC information may be used in an audience rating scheme, where EC information is transmitted to a particular group of subscribers, and information is obtained regarding the number of subscribers which have redeemed the ECs. This allows a manufacturer to target various demographic groups to enhance the effectiveness of their advertising programs.

In fact, group or individual identifiers may be set in the decoders. For example, an individual decoder unit identifier may comprise a decoder

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serial number or any other unique identifier. Such an individual identifier can be set at the factory at the time of manufacture, or during initial use of the unit. Furthermore, group addresses which define a group of decoders may also be set at the factory, and may be set or updated periodically during use based on purchase activities or other usage thresholds. Additionally, the group identifiers may be set by various manufacturers or service providers as part of an incentive program. For example, when a consumer has been chosen to participate in an audience rating period, the consumer's decoder unit may be enabled in that period such that additional rewards are granted for providing feedback, e.g., via a telephone call, mail in survey, or usage of the ECs. Moreover, consumers who redeem many ECs may be assigned to frequent shopper groups which are provided with additional EC promotions, or given bonus points which may be accumulated to obtain a prize. This is analogous to so-called "frequent flier miles" which airline travelers may accumulate each time they fly on a specific airline.

FIGURE 5 illustrates a method for storing electronic coupon data in accordance with the present invention. At block 500, the EC information is received by a decoder such as the decoder 400 of FIGURE 4. At block 502, the EC information is optionally authenticated (e.g., screened for

validity). This can prevent tampering and other fraudulent activities of pirates who seek to gain unauthorized EC information. For example, the EC information may include encrypted data that can be authenticated with a cryptographic key. The EC information is further checked to determine if the user is authorized to receive the EC information. For example, a decoder sold or distributed to children may not be authorized to receive EC information for alcoholic beverages.

At block 505, the consumer is optionally prompted to accept the EC information. In this manner, the decoder's memory will not become filled with EC information that is not of interest to the consumer. At block 510, the EC information is placed into a buffer for temporary storage. At block 515, the existing coupons in the permanent memory are checked. At block 520, a determination is made as to whether the EC information in the buffer corresponds to EC information which is already stored in the memory (e.g., there is a duplicate coupon). At block 525, if there is a duplicate coupon, it is determined if the EC in the buffer has the later expiration date. At block 530, if this is not true, the EC in the buffer is discarded. At block 540, if this is true, the EC in the memory which has the earlier expiration date is removed, and at block 535, the EC in the buffer is

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then recorded in the permanent memory. Alternatively, if no duplicate was detected at block 520, the EC in the buffer is immediately stored in the memory.

Moreover, once the determination regarding the existence of a duplicate coupon has been made by the decoder, the pertinent information should be recorded in the most efficient manner possible. In particular, efficiency factors which should be considered include the need to minimize the amount of memory used, and to provide quick access by external interfaces such that expired coupons can be removed and UPCs can be easily matched at a POS terminal at a retail store.

Of course, it may be desirable to allow the consumer to accumulate several coupons of the same type with the same or different expiration dates. In this case, the consumer may be allowed to redeem more than one coupon of a specific product or service on a single shopping trip, or the consumer may be limited to redeeming one coupon of a given product or service in a specific time frame, for example, once a week.

Furthermore, when an EC decoder memory module is full and additional EC information cannot be accepted, the consumer may have the capability to accept no new coupons, or to overwrite the coupons which are currently in memory according to their

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expiration date or other factor such as product category, or amount of discount. Moreover, when time and date information is available to the decoder such as via an internal clock or time stamp carried with the same data stream in which the EC information is carried, the decoder unit can automatically delete selected older or expired coupons. For example, ECs may be stored for a predetermined amount of time, e.g., one month befcre being deleted.

FIGURE 6 is a block diagram of a point-of-sale (POS) apparatus for redeeming electronic coupons in accordance with the present invention. In particular, a POS terminal 600 is provided for receiving EC information from the consumer's decoder or transportable memory module 425. This information transfer may occur, for example, by swiping the smart card through a reader of the POS terminal, or by otherwise providing a wired or wireless communication path between the memory module 425 and the POS terminal 600. The POS terminal, which includes an associated processor such as a CPU, may also communicate with an interface 610 of a bank or other financial institution to allow a consumer to pay for a purchase via a bank card which directly debits the account for the amount of the purchase.

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The POS terminal 600 may also communicate with a scanner 605 of the sort which is commonly used to read bar codes (e.g., UPCs) on goods. In particular, the POS terminal 600 may automatically compare the UPC of the purchased goods with the UPCs of the ECs to determine if there is a match. If so, and further assuming the EC has not expired, the consumer is credited for the relevant discount. This is advantageous for the retailer who may inadvertently redeem a conventional paper coupon improperly and may not be able to obtain a reimbursement from the manufacturer.

Furthermore, a record of each EC which is redeemed may be kept in a database (e.g., memory) 615 which is maintained by the retail store. This allows the retailer to monitor the use of ECs and to better control inventory. The database 615 may communicate with an interface to manufacturers 620, which is a communication path such as a telephone line which allows the retailer to turn in the EC information to the manufacturers to obtain a reimbursement according to the terms of the EC. Moreover, the EC redemption information may be provided to the manufacturer real-time as the transaction occurs, or the information may be accumulated, for example, over the course of a day or a week. Alternatively, the database information

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may be downloaded to a storage medium such as a floppy disk and mailed to the manufacturer.

Note that the present invention can significantly reduce the administrative costs of both the retailer and the manufacturer in handling coupons. With conventional paper coupons, the retailer must verify that the consumer has met the terms of the coupon to obtain the discount. This is often a difficult task where mistakes can easily occur, and which often causes inconvenient delays for other customers. Furthermore, the retailer has the time-consuming task of organizing various coupons, which are often torn or otherwise mutilated or illegible, submitting them to the proper manufacturer with proof of the purchase specified in the coupon, and waiting for a reimbursement.

Furthermore, the manufacturer must also organize the paper coupons, and provide the appropriate reimbursement. Additionally, the manufacturer has the task of trying to verify that the coupons were redeemed properly in order to maintain the integrity of the system. Accordingly, by providing automatic electronic verification of purchases and EC redemptions, the present invention also protects the manufacturers from providing a reimbursement for coupons that have been improperly redeemed. After the consumer has selected the goods and brought them to a checkout station in the store,

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the EC module is used to download information directly into a POS terminal. This process is analogous to scanning the bar code found on a conventional paper coupon. At this time, the expired coupons may be expunged from the decoder if this has not already occurred. Moreover, by having the POS terminal 600 process the EC data to expunge the expired EC information, it is possible to simplify the decoder by eliminating the need for the decoder to maintain accurate date and time information.

A direct connection between the memory module 425 and the POS terminal 600 can be made, for example, with a hardware connection such as a computer or edge connector, or a wireless connection such as a radio frequency (RF) or infra-red (IR) transmitter/receiver system. In one embodiment, there is a single-direction connector which downloads all or part of the EC information from the memory module 425 to the POS terminal 600. Alternatively, a bi-directional link may be established between the POS terminal and the memory module such that, for every item scanned via the scanner 605 or otherwise entered into the POS system, a query is made for any ECs that apply, and the appropriate discount is given. The link provided may be a secure link to prevent tampering. For example, various cryptographic processes may be

used to authenticate the data which is transferred between the POS terminal 600 and the memory module 425.

Moreover, the query and discount process can occur real-time during the scanning process, or at the end of the transaction, when a total bill has been obtained. Furthermore, the bi-directional link can provide a confirmation that an EC has been used and can therefore be deleted from the memory module. Similarly, as the link is established, the POS terminal can provide a time and date marker to the memory module for use in deleting expired ECs.

Note further that the processing time for the downloading of the EC information and the comparison with the UPC information from the scanner 605 can be minimized by processing only the minimal required amount of data. For example, the product name or description which may be carried by the EC decoder or memory module may not be necessary for the decoder or POS system to complete their required functions, and therefore need not be processed by the system. Typically, the bare minimum of EC information which the POS terminal must have is the UPC of the EC and the amount of the discount.

Note that, since the EC information is maintained in a digital format, the probability of an error during processing by the POS terminal 600 should be relatively small. Furthermore, note that

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conventional error control and correction techniques may be employed to ensure error-free communication of the EC information.

In a further embodiment of the present invention, the retailer may provide a coupon information center which assists the consumer in verifying the EC information. For example, the information station may be a stand-alone computer with an interface to the EC memory. With an integrated EC decoder, the interface may be a control-level interface to the decoder's microcontroller. When a removable EC memory module is carried by the consumer, the information station may provide all microcontroller functions, and treat the EC module as an ancillary memory. In particular, the information station may include a screen for displaying the EC information, or a printer for providing a list of the EC products and printing a corresponding paper coupon. Additionally, the retailer may include information such as the location of the product in the store to further assist the consumer.

Accordingly, it can be seen that the present invention provide an electronic coupon system which can replace conventional paper coupons, thereby producing significant savings for both retailers and manufacturers, while providing various promotional schemes for consumers. The system takes full

advantage of various broadcast and electronic network infrastructures currently in place or planned. In particular, the infrastructure includes the conventional radio and/or television found in virtually all households. Furthermore, the fact that the EC information has been encoded into an advertisement using HDT has no impact on that infrastructure.

Similarly, at the retail location, the existing infrastructure is used to the greatest extent possible. The primary impact on this infrastructure has to do with the hardware interface between the decoder/memory unit and the POS equipment, and the software interface to download and delete the appropriate information from the EC decoder/memory unit. Nevertheless, the system is believed to be economically feasible for retailers and manufacturers alike due to the potential savings with reduced handling of paper coupons and improved verification and record keeping of redemptions and reimbursements.

Although the invention has been described in connection with various specific embodiments, those skilled in the art will appreciate that numerous adaptations and modifications may be made thereto without departing from the spirit and scope of the invention as set forth in the claims. In particular, while the EC information was embedded

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inaudibly into a primary audio signal in some of the examples discussed herein, the EC information may be embedded into virtually any type of electromagnetic signal, whether in the sub-audio, audio, or supra-audio frequency bands.

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CLAIMS:

1. An apparatus for processing electronic coupon information which is embedded in a primary data stream, comprising:

interface means for receiving said data stream;

decoder means for recovering said electronic coupon information from said received data stream; and

memory means for storing said recovered electronic coupon information.

2. The apparatus of claim 1, wherein said electronic coupon information is carried in said data stream according to a hidden data transport scheme.

3. The apparatus of claim 1, wherein said electronic coupon information is carried substantially inaudibly in a primary audio data stream.

4. The apparatus of claim 1, wherein said electronic coupon information is carried substantially imperceptibly in a primary video data stream.

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5. The apparatus of claim 1, wherein said memory means is replaceably removable from said decoder.

6. The apparatus of claim 1, further comprising:

display means for providing information regarding said electronic coupon information stored in said memory means.

7. The apparatus of claim 6, wherein said display means comprises a screen for reproducing a bar code which may be scanned to retrieve said information regarding said electronic coupon information.

8. The apparatus of claim 1, further comprising:

a user-activated control for selectively recovering and storing said electronic coupon information.

9. The apparatus of claim 1, further comprising:

means for authenticating said electronic coupon information.

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10. The apparatus of claim 1, wherein said electronic coupon information includes a product code segment for identifying a product associated with said coupon.

11. The apparatus of claim 10, wherein said electronic coupon information includes a discount segment for identifying a promotion associated with said coupon.

12. The apparatus of claim 10, wherein said electronic coupon information includes an expiration date segment for identifying an expiration date associated with said coupon.

13. The apparatus of claim 10, further comprising:

processing means responsive to said expiration date segment for maintaining specific coupons in said memory.

14. A method for processing electronic coupon information which is embedded in a primary data stream, comprising the steps of:

receiving said data stream;

recovering said electronic coupon information from said received data stream; and

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storing said recovered electronic coupon information.

15. The method of claim 14, wherein said electronic coupon information is carried in said data stream according to a hidden data transport scheme.

16. The method of claim 14, wherein said electronic coupon information is carried substantially inaudibly in a primary audio data stream.

17. The method of claim 14, wherein said electronic coupon information is carried substantially imperceptibly in a primary video data stream.

18. The method of claim 14, comprising the further step of:

activating a control to selectively recover and store said electronic coupon information.

19. The method of claim 14, wherein said electronic coupon information includes a product code segment for identifying a product associated with said coupon.

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20. The method of claim 14, wherein said electronic coupon information includes an expiration date segment for identifying an expiration date associated with said coupon.

21. The method of claim 14, wherein said electronic coupon information includes a discount segment for identifying a promotion associated with said coupon.

22. The method of claim 14, comprising the further step of:

authenticating said electronic coupon information prior to said storing step.

23. An apparatus for processing electronic coupon information which includes a product code segment for identifying a product associated with said coupon, comprising:

a point-of-sale terminal, said terminal comprising:

an interface for receiving said electronic coupon information from a memory; and

an interface for receiving product information of a particular product from a scanner; and

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processing means which is responsive to said product information for determining whether said electronic coupon information is applicable to said particular product.

24. The apparatus of claim 23, further comprising:

a database for storing said electronic coupon information and information associated with said particular product when said processing means determines that said electronic coupon information is applicable to said particular product.

25. The apparatus of claim 23, wherein said electronic coupon information includes a discount segment for identifying a promotion associated with said coupon.

26. The apparatus of claim 23, wherein said electronic coupon information includes an expiration date segment for identifying an expiration date associated with said coupon.

27. The apparatus of claim 26, wherein said processing means is responsive to said expiration date segment for maintaining specific coupons in said memory.

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28. The apparatus of claim 23, further comprising:

means for authenticating said electronic coupon information.

29. A method for processing electronic coupon information which includes a product code segment for identifying a product associated with said coupon, comprising the steps of:

receiving said electronic coupon information from a memory;

receiving product information of a particular product from a scanner; and

using said product information to determine whether said electronic coupon information is applicable to said particular product.

30. The method of claim 29, comprising the further step of:

storing said electronic coupon information and information associated with said particular product when said determining step determines that said electronic coupon information is applicable to said particular product.

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31. The method of claim 29, wherein said electronic coupon information includes a discount segment for identifying a promotion associated with said coupon.

32. The method of claim 29, wherein said electronic coupon information includes an expiration date segment for identifying an expiration date associated with said coupon.

33. The method of claim 32, comprising the further step of:

maintaining specific coupons in said memory in response to said expiration date segment.

34. The method of claim 29, comprising the further step of:

authenticating said electronic coupon information.

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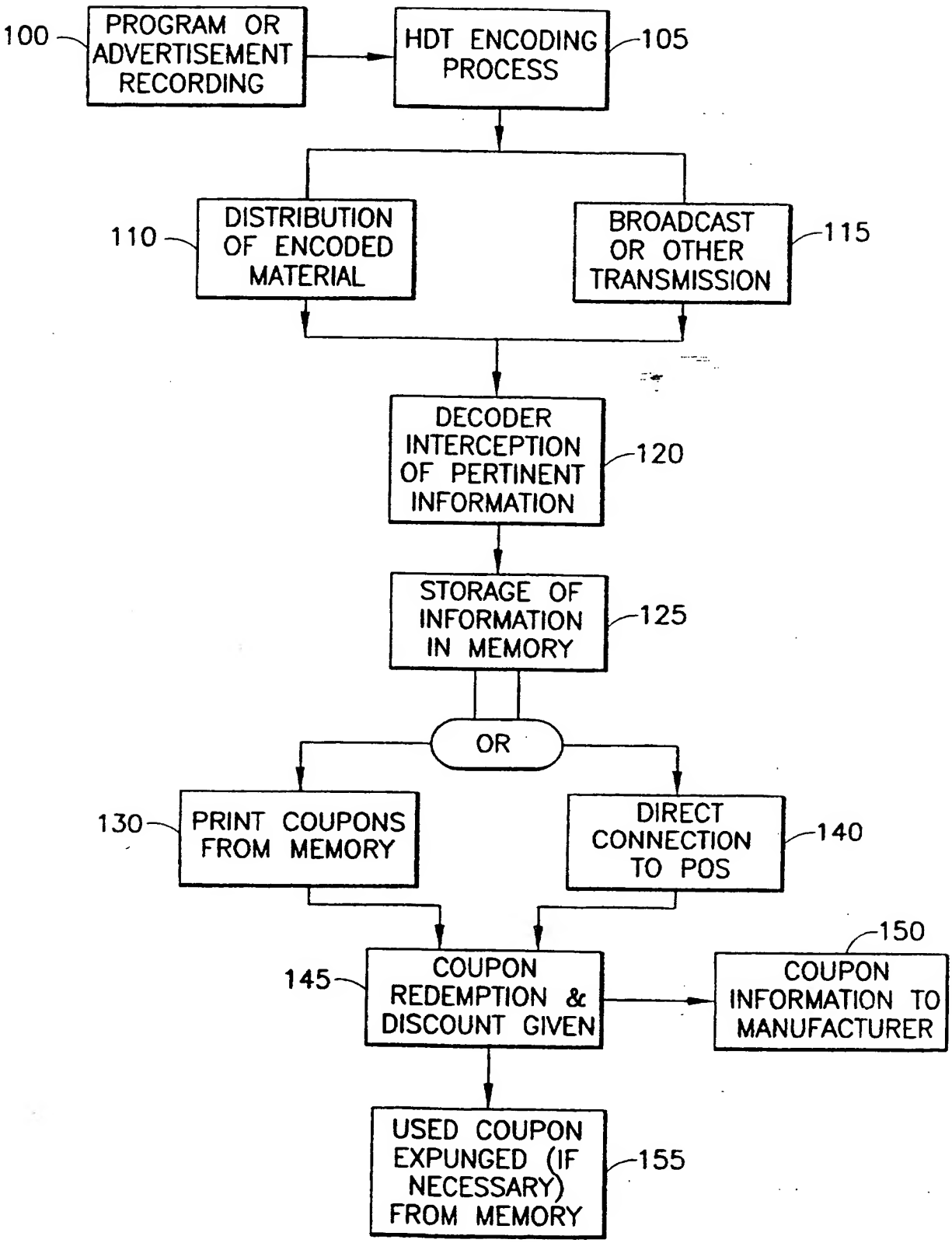

FIG. 1

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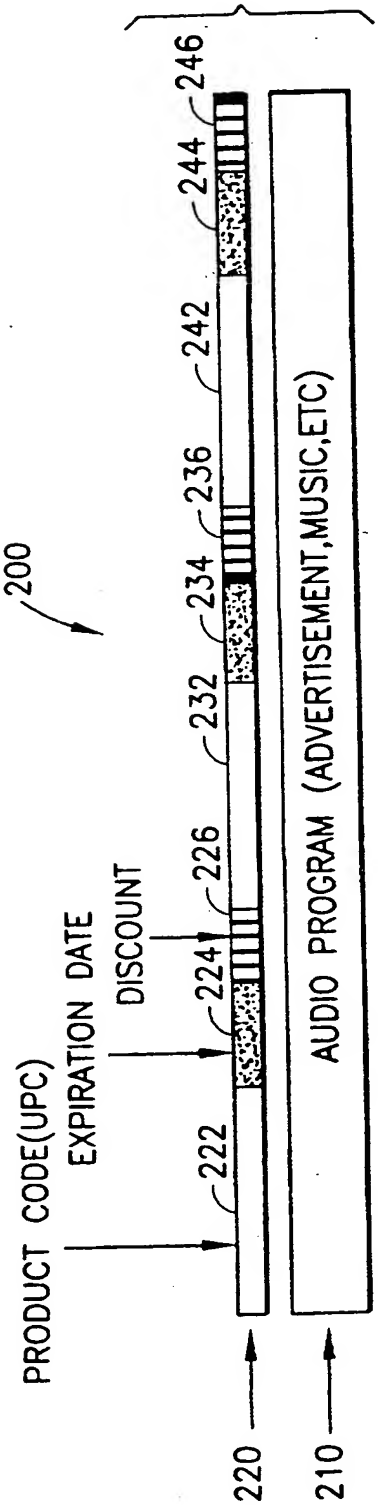

FIG.2

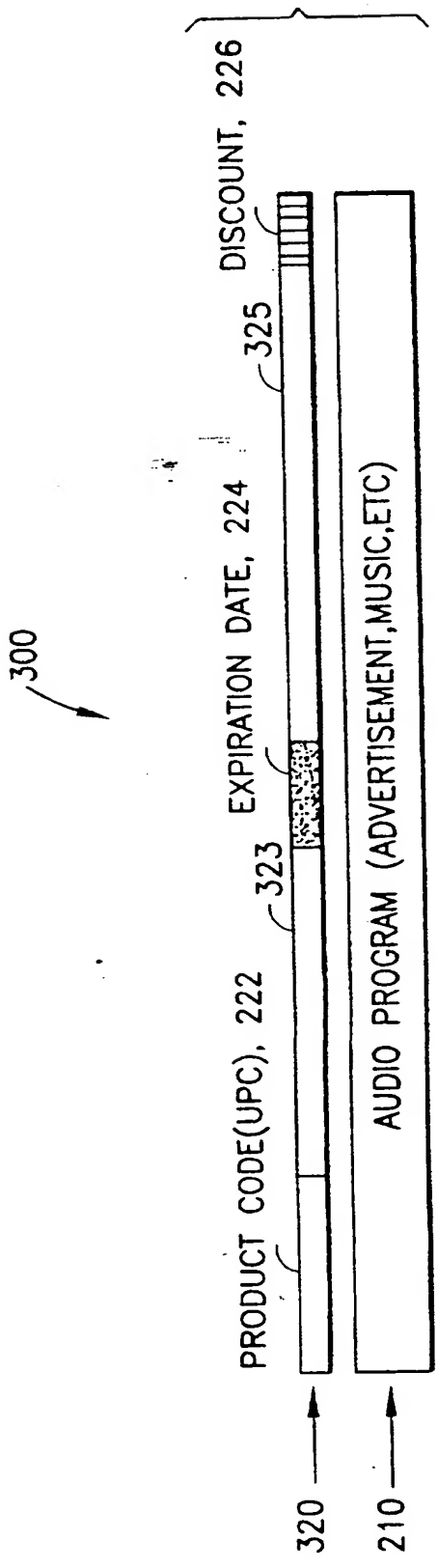

FIG.3

BNSDOCID: <WO___9721200A2_I_>

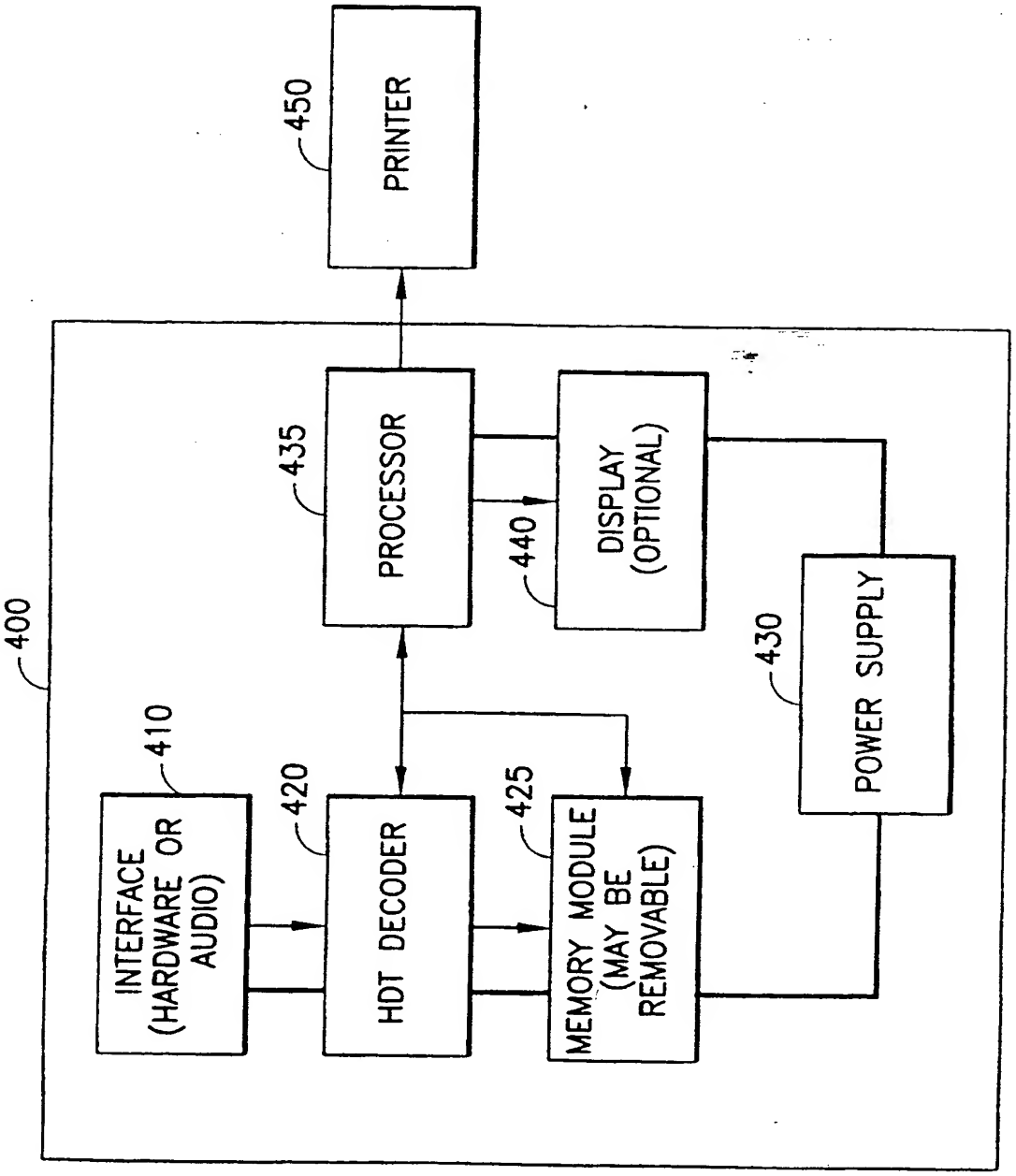

FIG.4

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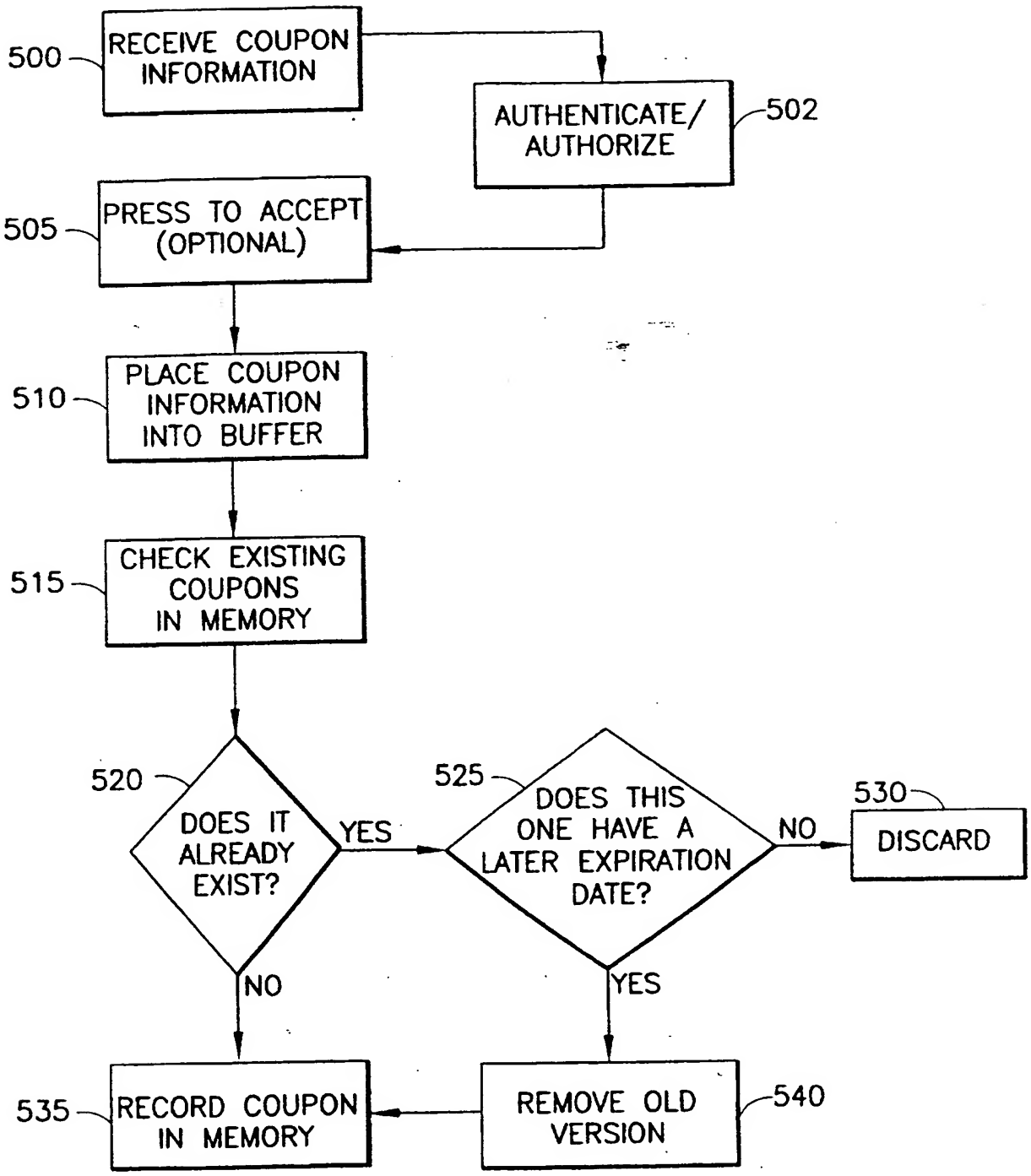
500
RECEIVE COUPON INFORMATION
AUTHENTICATE/ AUTHORIZE
502
505
PRESS TO ACCEPT (OPTIONAL)
510
PLACE COUPON INFORMATION INTO BUFFER
515
CHECK EXISTING COUPONS IN MEMORY
520
DOES IT ALREADY EXIST?
YES
525
DOES THIS ONE HAVE A LATER EXPIRATION DATE?
NO
530
DISCARD
NO
YES
535
RECORD COUPON IN MEMORY
REMOVE OLD VERSION
540

FIG.5

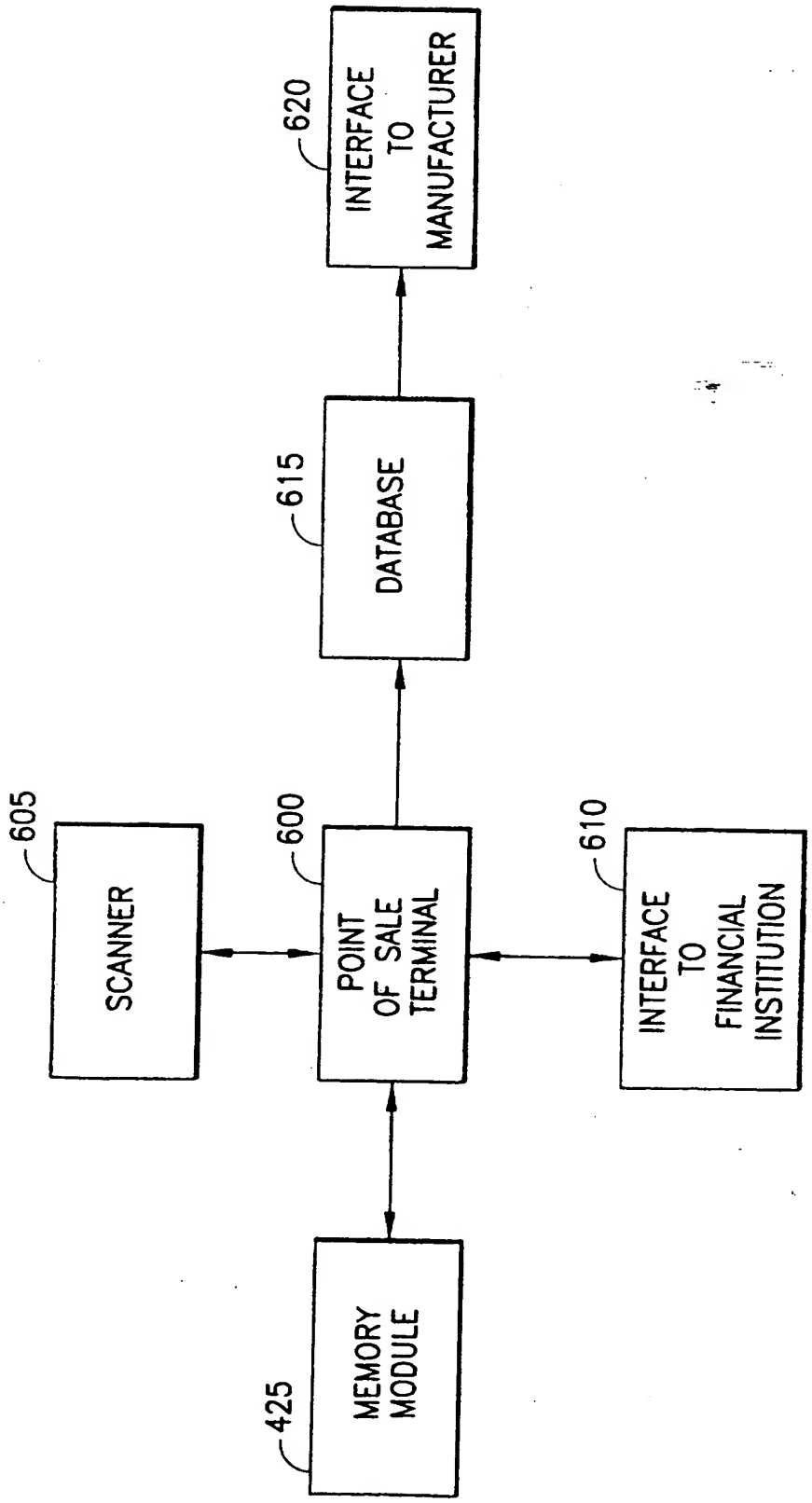

FIG.6

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(74) Agent: LIPSITZ, Barry, R.; 755 Main Street, Monroe, CT 06468 (US).

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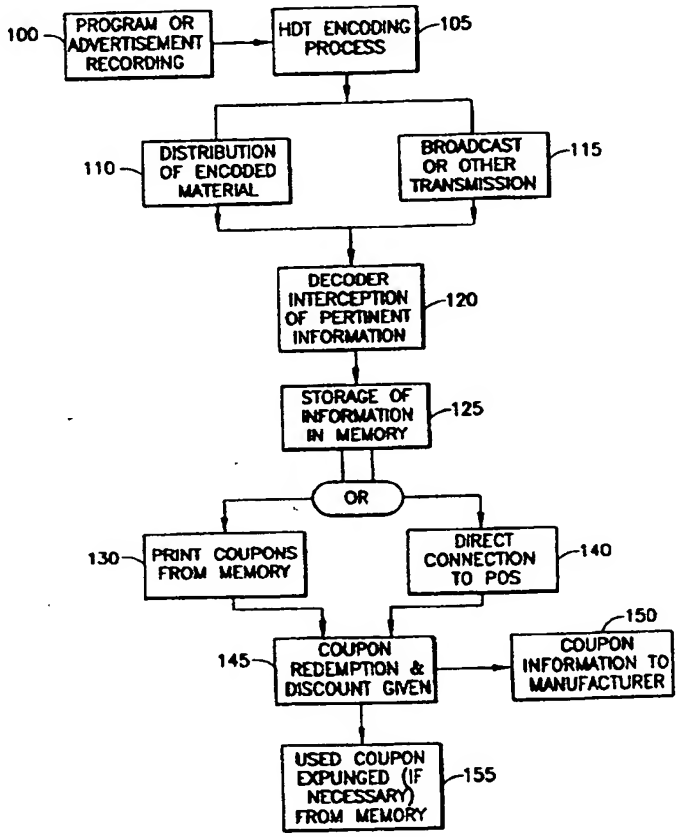
(57) Abstract

Electronic coupon information is embedded in an audio, video or other primary signal (200) using a hidden data transport scheme. The electronic coupon information may be received and decoded by a low cost, portable decoder unit (400) in a consumer's home. The decoder may have a removable memory module (425) that can be easily carried by the consumer to a retail store. At the retail store, the consumer selects products to purchase and brings them to a point-of-sale (POS) terminal (600) at a checkout station. At the POS terminal, the memory module (425) or decoder (400) interfaces with the POS terminal (600) and a conventional scanner (605) to determine which products are eligible for the discount described in the electonic coupons. After crediting the consumer with the appropriate discount, a record of the transaction is stored in a database (615), and the retailer may transmit the database to the manufacturers via an interface (625) to obtain a reimbursement. The invention eliminates the need for retailers and manufacturers to process paper coupons, while providing consumers with various incentives.



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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 96/19370

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	see the whole document	2,3,15, 16 23-28
A	---	
Y	US 5 319 735 A (PREUSS ROBERT D ET AL) 7 June 1994 cited in the application see the whole document	2,3,15, 16
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Information on patent family members

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AMENDED CLAIMS

[received by the International Bureau on 1 August 1997 (01.08.97);
original claims 1-4 and 14-17 amended; remaining claims unchanged (3 pages)]

1. An apparatus for processing electronic coupon information which is embedded substantially inaudibly in an audio signal, comprising:

interface means for receiving said audio signal;

decoder means for recovering said electronic coupon information from said received audio signal; and

memory means for storing said recovered electronic coupon information.

2. The apparatus of claim 1, wherein said electronic coupon information is carried in said audio signal according to a hidden data transport scheme.

3. The apparatus of claim 1, wherein

said audio signal is emitted by a speaker; and

said interface means comprises a microphone which is adapted to receive said emitted audio signal.

4. The apparatus of claim 1, wherein:

said audio signal is provided as a baseband signal; and

said interface means comprises an audio input jack which is adapted to receive said baseband signal.

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10. The apparatus of claim 1, wherein said electronic coupon information includes a product code segment for identifying a product associated with said coupon.

11. The apparatus of claim 10, wherein said electronic coupon information includes a discount segment for identifying a promotion associated with said coupon.

12. The apparatus of claim 10, wherein said electronic coupon information includes an expiration date segment for identifying an expiration date associated with said coupon.

13. The apparatus of claim 10, further comprising:

processing means responsive to said expiration date segment for maintaining specific coupons in said memory.

14. A method for processing electronic coupon information which is embedded substantially inaudibly in an audio signal, comprising the steps of:

receiving said audio signal;

recovering said electronic coupon information from said received audio signal; and

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storing said recovered electronic coupon information.

15. The method of claim 14, wherein said electronic coupon information is carried in said audio signal according to a hidden data transport scheme.

16. The method of claim 14, wherein:

said audio signal is emitted by a speaker; and

said receiving step comprises the step of using a microphone to receive said emitted audio signal.

17. The apparatus of claim 14, wherein:

said audio signal is provided as a baseband signal; and

said receiving step comprises the step of using an audio input jack to receive said baseband signal.

18. The method of claim 14, comprising the further step of:

activating a control to selectively recover and store said electronic coupon information.

19. The method of claim 14, wherein said electronic coupon information includes a product code segment for identifying a product associated with said coupon.

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